



**THE
ONTARIO WATER RESOURCES
COMMISSION**

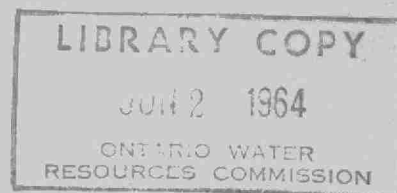
REPORT ON

WATER POLLUTION SURVEY

of the

MUSKOKA LAKES

JUNE and AUGUST, 1961



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R E P O R T

on

WATER POLLUTION SURVEY

of the

M U S K O K A L A K E S

June and August, 1961

R E P O R T

Waterway: Muskoka Lakes

Dates of Sampling: June 19 - 21 and August 14 - 16, 1961

Sampling by: S. Salbach, P. Lonergan and P. J. Walsh.

Report by: P. J. Walsh

INTRODUCTION

A number of samples for laboratory analyses were collected on two separate occasions from predetermined points in the major interconnecting lakes of the Muskoka River.

The collection of such samples is in keeping with the functions of the Ontario Water Resources Commission in its programme to prevent and eliminate pollution of all surface and ground waters in Ontario. This particular sampling, however, was occasioned following a request by the Muskoka District Health Unit for assistance in determining if the lakes contained any significant pollution.

The first series of samples taken on June 19 - 21 was intended to represent the condition of the lakes prior to the tourist season. The second sampling run was made on August 14 - 16 in order to present the condition of the lakes, either during or immediately after, the height of the tourist traffic, depending on the state of the weather. There was little use of a recreational nature being made of the various lakes during the period of August 14 - 16, presumably due to wet and cooler weather prevailing at the time.

The sampling points selected were considered salient spots on the lakes, designed to furnish information on those sections where the traffic was greatest or where the maximum potential or actual sources of pollution, if present, would exist.

In general, the samples were taken between 100' - 500' off-shore either directly opposite or in the vicinity of the larger tourist resorts and adjacent to local municipalities.

The approximate locations of the sampling points are shown on figure 1, attached to this report.

EXPLANATION OF TESTS

The first set of samples were examined only for bacteria. The analyses of some of the samples of the second lot included determinations of biochemical oxygen demand (B.O.D.) and turbidity in addition to bacterial examination.

A brief explanation of each follows as an aid in interpreting the significance of the tests and the results:

1. Biochemical Oxygen Demand (B.O.D.)

The B.O.D. determination provides an index of the putrescible organic matter in the sample. This is obtained by measuring the amount of oxygen required for the stabilization of the decomposable material during a period of five days incubation.

High biochemical oxygen demands reduce and may eliminate the dissolved oxygen content in stream waters.

A B.O.D. figure of not more than 4 ppm is usually accepted as being satisfactory for water in a stream.

2. Solids

The analyses for solids usually include tests for total, suspended and dissolved solids. The former measures both the solids in solution and in suspension. Suspended solids indicate the measure of undissolved solids of organic or inorganic nature, whereas the dissolved solids are a measure of those solids in solution.

Land erosion, sewage and industrial wastes are all significant sources of solids. Domestic sewage contains approximately 0.2 pounds of suspended solids per capita per day. Solids in industrial wastes vary with the type of industry.

The effects of suspended solids in water are reflected in difficulties associated with water purification, deposition in streams, interference with navigation and injury to the habitat of fish.

3. Turbidity

Turbidity is a measure of the fine suspended solids in water such as silt and finely divided organic matter. Where suspended solid values approach 20 parts per million or less, the results are usually reported as turbidity in silica units.

4. Membrane Filter Coliform Count

The membrane filter technique is used to obtain a direct enumeration of coliform organisms. These organisms are normal inhabitants of man and other warm blooded animals.

They are always present in large numbers in sewage and are, in general, relatively few in number in other stream pollutants. The results are reported as M.F. coliform count per 100 millilitres.

A count of 2,400 per 100 ml. in streams is reasonable. Raw or partially treated sewage may contain many million coliform bacteria per 100 ml.

ANALYSES OF SAMPLES

The laboratory analyses of the samples collected from the various lakes are recorded in Table 1 as follows:

TABLE 1

1. Lake Muskoka

(All analyses in ppm unless otherwise indicated)

<u>Sampling Point No.</u>	<u>5-Day B.O.D.</u>	<u>Total Solids</u>	<u>Turbidity in Silica Units</u>	<u>M.F. Coliform Count/100 ml.</u>
MU-1	--	--	--	107 *
-1	--	--	--	0 **
-2	--	--	--	2 *
-2	--	--	--	0 **
-3	--	--	--	400 *
-3	--	--	--	0 **
-4	--	--	--	0 *
-4	--	--	--	0 **
-5	--	--	--	30 *
-5	--	--	--	0 **
-6	--	--	--	8 *
-6	--	--	--	0 **
-7	--	--	--	18 *
-7	--	--	--	0 **
-8	--	--	--	4 *
-8	--	--	--	0 **
-9	--	--	--	63 *
-9	0.5	38	1	0 **
-9A	--	--	--	8 *
-9A	--	--	--	0 **
-10	--	--	--	13 *
-10	--	--	--	0 **
-11	--	--	--	12 *
-11	--	--	--	0 **
-12	--	--	--	4 *
-12	--	--	--	0 **
-12A	--	--	--	6 *
-12A	--	--	--	0 **
-13	--	--	--	10 *
-13	--	--	--	0 **

<u>Sampling Point No.</u>	<u>5-Day B.O.D.</u>	<u>Total Solids</u>	<u>Turbidity in Silica Units</u>	<u>M.F. Coliform Count/100 ml.</u>
MU-14	--	--	--	2 *
14	--	--	--	0 **
-14A	--	--	--	2 *
-14A	No sample collected on Aug. 14/61			- **
-15	--	--	--	109 *
-15	--	--	--	0 **
-15A	--	--	--	1,000 *
-15A	--	--	--	0 **
-16	--	--	--	0 *
-16	0.4	38	1	0 **
-17	--	--	--	0 *
-17	--	--	--	0 **
-18	--	--	--	0 *
-18	--	--	--	0 **
-19	--	--	--	2 *
-19	0.3	34	1	0 **
-20	--	--	--	3 *
-20	--	--	--	0 **
-21	--	--	--	11 *
-21	--	--	--	0 **
-22	--	--	--	1 *
-22	--	--	--	0 **
-23	--	--	--	1 *
-23	--	--	--	0 **
-24	--	--	--	6 *
-24	--	--	--	0 **
-24A	--	--	--	7 *
-24A	--	--	--	0 **

* samples collected on June 19, 1961

** samples collected on August 14, 1961

2. Rosseau Lake

<u>Sampling Point No.</u>	<u>M.F. Coliform Count/100 ml.</u>
RO-1	0 *
-1	2 **
-2	0 *
-2	4 **
-3	1 *
-3	0 **
-4	4 *
-4	14 *
-4A	9 *
-4A	2 **
-5	0 *
-5	8 **
-6	1 *
-6	0 **
-7	0 *
-7	0 **
-8	30 *
-8	14 **
-9	0 *
-9	0 **
-10	0 *
-10	0 **
-10A	3 *
-10A	0 **
-11	3 *
-11	0 **
-12	4 *
-12	0 **
-12A	9 *
-12A	14 **
-13	1,200 *
-13 No sample collected on August 15/61	-- **
-14	5 *
-14	8 **

* Samples collected on June 20, 1961

** Samples collected on August 15, 1961

3. Lake Joseph

<u>Sampling Point No.</u>	<u>M.F. Coliform Count/100 ml.</u>
JO-1	0 *
-1	0 **
-2	1 *
-2	0 **
-2A	3 *
-2A	0 **
-3	1 *
-3	6 **
-4	0 *
-4	0 **
-5	2 *
-5	0 **
-6	0 *
-6	0 **
-7	1 *
-7	0 **
-8	0 *
-8 No sample collected on August 15, 1961	**
-9	1 *
-9	0 **
-10	0 *
-10	4 **
-11	0 *
-11	34 **

* samples collected on June 20, 1961

** samples collected on Aug. 15, 1961

4. Lake of Bays

<u>Sampling Point No.</u>	<u>5-Day B.O.D.</u>	<u>Total Solids</u>	<u>Turbidity in Silica Units</u>	<u>M.F. Coliform Count/100 ml.</u>
LB-1	--	--	--	15 *
-1	--	--	--	0 **
-2	--	--	--	2 *
-2	0.5	34	1	0 **
-3	--	--	--	51 *
-3	--	--	--	0 **
-4	--	--	--	0 *
-4	--	--	--	0 **
-5	--	--	--	1 *
-5	0.7	28	1	0 **
-6	--	--	--	2 *
-6	--	--	--	0 **
-7	--	--	--	1 *
-7	--	--	--	0 **
-8	--	--	--	2 *
-8	0.5	28	1	0 **
-9	--	--	--	1 *
-9	1.0	28	1	0 **
-10	--	--	--	2 *
-10	--	--	--	0 **
-11	--	--	--	1 *
-11	--	--	--	0 **
-12	--	--	--	0 *
-12	0.6	26	1	0 **
-13	--	--	--	142 *
-13	--	--	--	0 **
-13A	No sample collected on June 21/61			*
-13A	0.7	32	1	0 **
-13B	No sample collected on June 21/61			*
-13B	0.5	30	1	0 **
-14	--	--	--	0 *
-14	--	--	--	0 **

<u>Sampling Point No.</u>	<u>5-Day B.O.D.</u>	<u>Total Solids</u>	<u>Turbidity in Silica Units</u>	<u>M.F. Coliform Count/100 ml.</u>
LB-15	--	--	--	0 *
-15	0.4	28	1	0 **
-15A	--	--	--	2 *
-15A	--	--	--	0 **
-16	--	--	--	0 *
-16	--	--	--	0 **
-17	--	--	--	2 *
-17	--	--	--	0 **
-17A	--	--	--	0 *
-17A	--	--	--	0 **
-18	--	--	--	0 *
-18	--	--	--	0 **
-19	--	--	--	0 *
-19	--	--	--	0 **
-20	--	--	--	0 *
-20	--	--	--	0 **
-21	--	--	--	2 *
-21	--	--	--	0 **
-22	--	--	--	0 *
-22	--	--	--	0 **
-23	--	--	--	4 *
-23	0.6	28	1	0 **
-24	--	--	--	7 *
-24	0.5	24	1	0 **

* Samples collected on June 21, 1961

** Samples collected on Aug. 16, 1961

5. Fairy & Peninsula Lakes

<u>Sampling Point No.</u>	<u>5-Day B.O.D.</u>	<u>Total Solids</u>	<u>Turbidity in Silica Units</u>	<u>M.F. Coliform Count/100 ml.</u>
FP-1	--	--	--	71 *
-1				0 **
-2	--	--	--	8 *
-2				2 **
-2A	No sample collected on June 21/61			*
-2A	0.9	38	2	6 **
-3				0 *
-3				0 **
-4				0 *
-4				0 **
-5				0 *
-5	0.6	34	1	0 **

6. Mary Lake

MA-1	--	--	--	14 *
-1	0.7	40	1	0 **
-2	--	--	--	0 *
-2	--	--	--	0 **
-2A	--	--	--	3 *
-2A	--	--	--	0 **
-3	--	--	--	9 *
-3	--	--	--	0 **
-4	--	--	--	3 *
-4	0.3	40	1	0 **

* Samples collected on June 21, 1961

** Samples collected on Aug. 16, 1961

COMMENT ON ANALYSES

The analyses of two sets of samples collected from the major lakes in the District of Muskoka indicated that the waters in question were in good condition from a bacteriological and chemical standpoint.

Although isolated sources of pollution from defective private sewage disposal systems and the discharge of sewage from boats may exist, no critical points were revealed as a result of the sampling carried out at the particular points selected in connection with this survey.

REMARKS

From the point of view of recreational activities, such as swimming and water-skiing, there is at present no apparent problem as far as pollution is concerned in the lake areas where these sports are normally conducted.

The main problem on the lakes is the question of whether the water is fit for human consumption without treatment.

The shoreline of the various lakes, that is accessible by car and is suitable for the location of cottages, is progressively developing with summer homes. In most cases, the water supply for these cottages is piped directly from the lake fronting on the property and is normally consumed without treatment.

In the past, cottagers have collected samples of their private water supplies and, on occasion, the bacteriological examinations of such samples have shown them to be unsatisfactory for drinking purposes.

The objectives for water quality in Ontario permit a count of 2400 total coliform organisms per 100 millilitres.

Surface water supplies could, therefore, be within the tolerances permitted and yet upon laboratory examination be reported as unsatisfactory for drinking purposes.

It should be kept in mind when discussing safe surface water supplies, that chlorination of the water supply is necessary to ensure a satisfactory quality at all times.

CONCLUSIONS

With the possible exception of a limited number of sources of water contamination, the problem of pollution of the Muskoka Lakes appears to be largely under control at the present time.

The Towns of Bala, Gravenhurst and Huntsville are already provided with municipal sewage treatment plants. Sewage works to serve Bracebridge are under construction at the present time.

The disposal of sewage from the smaller municipalities was not dealt with at this time, but will be examined at a later date.

It may also be necessary to review the control of discharge of sewage from pleasure craft on the lakes. Enquiries made during the surveys, however, did not indicate a problem in this respect at the present time.

All of which is respectfully submitted.

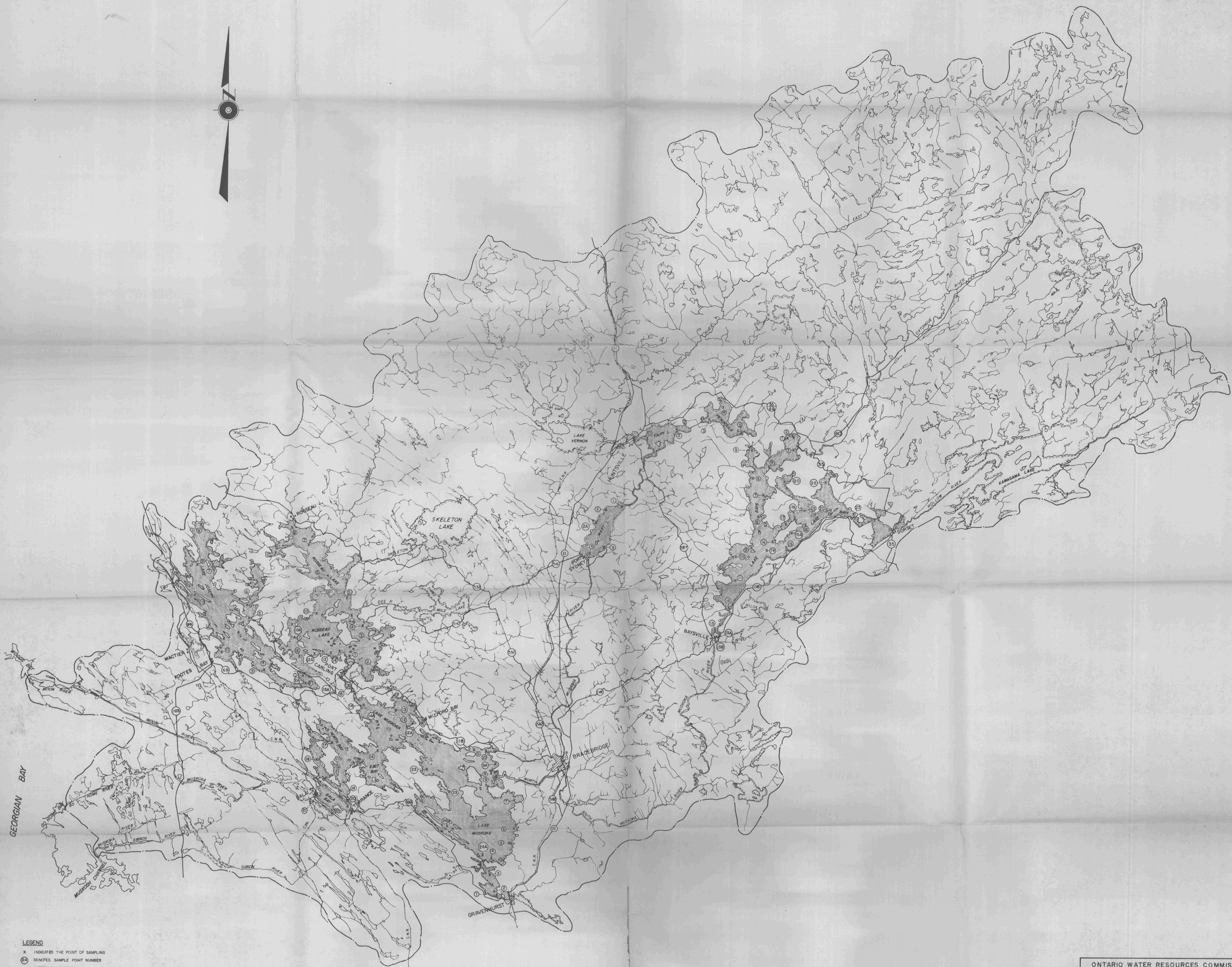
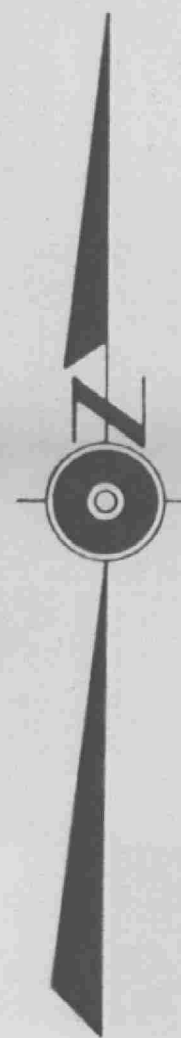
Prepared by: P.J. Walsh

District Engineer


E. Trewin

Approved by


Director,
Sanitary Engineering Division.



LEGEND
X INDICATES THE POINT OF SAMPLING
(24) DENOTES SAMPLE POINT NUMBER
--- WATERSHED BOUNDARY

ONTARIO WATER RESOURCES COMMISSION	
MUSKOKA RIVER WATERSHED SHOWING LAKE SAMPLING POINTS FIG. 1	
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